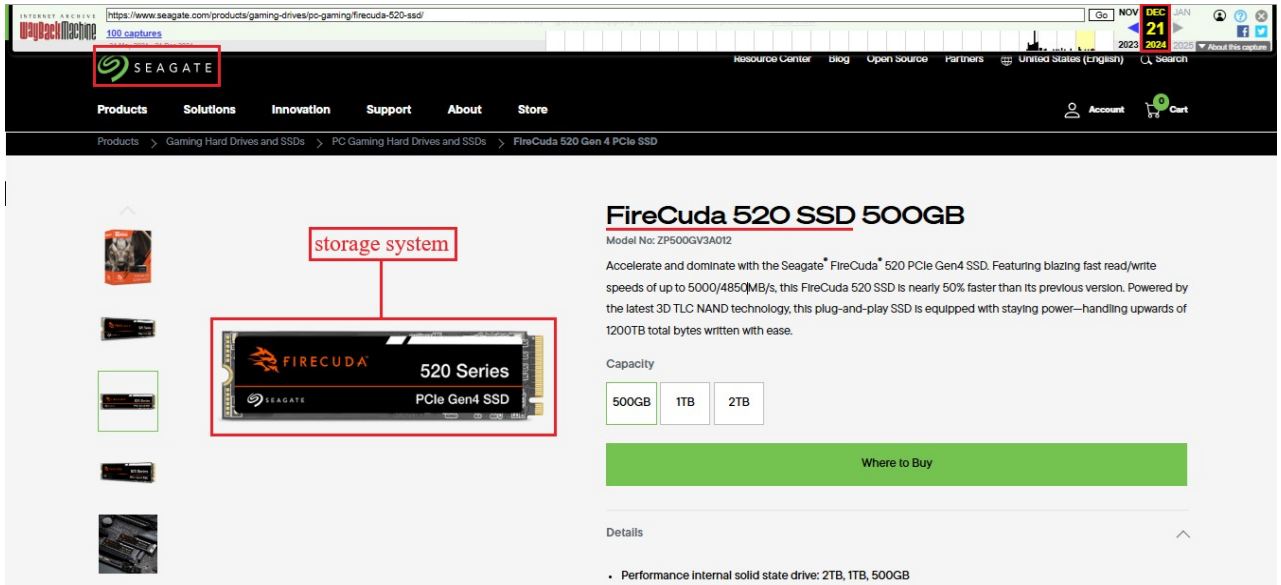
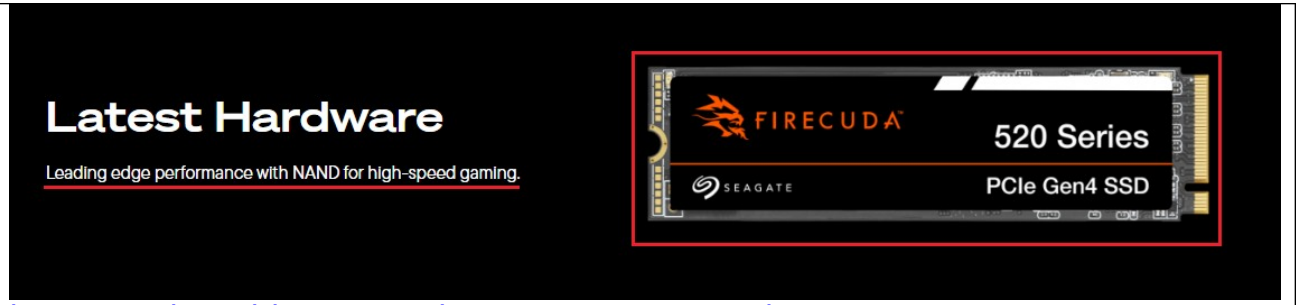
Exhibit 2

Method Claim: 1

US10095426	Seagate FireCuda 520 SSD (“The accused product”)
1. A method of storing data on a storage system comprising:	The accused product discloses a method of storing data on a storage system (e.g., the accused product). As shown below, the accused product is a storage system used by a host, such as a computer, to store data. SSDs use a controller to write data from the host to NAND flash in the form of blocks, managing wear leveling, error correction, and data integrity to optimize performance and extend the drive's lifespan.  https://web.archive.org/web/20241221014239/https://www.seagate.com/products/gaming-drives/pc-gaming/firecuda-520-ssd/#



https://web.archive.org/web/20241221014239/https://www.seagate.com/products/gaming-drives/pc-gaming/firecuda-520-ssd/#

https://www.seagate.com/content/dam/seagate/migrated-assets/www-content/datasheets/pdfs/new-firecuda-520-ssd-DS2124-1-2210-en_US.pdf

	Introducing the NAND Flash SSD Like an HDD, an SSD is a nonvolatile storage device that store data whether or not it is connected to power. An HDD, however, uses magnetic media to store its data, whereas the SSD uses integrated electronic circuitry to retain specific charge states, which in turn map to the data bit patterns. SSDs are based on flash memory technologies that enable data to be written, read, and erased multiple times. Flash memory comes in two varieties: NOR and NAND. Although each offers advantages and disadvantages (a discussion beyond the scope of this article), NAND has emerged as the favored technology because it delivers faster erase and write times. Most contemporary SSDs are based on NAND flash, which is why it's the focus of this article. An enterprise SSD contains multiple NAND flash chips for storing data. Each chip contains one or more dies, and each die contains one or more planes. A plane is divided into blocks, and a block is divided into pages. https://www.red-gate.com/simple-talk/databases/sql-server/database-administration-sql-server/storage-101-understanding-the-nand-flash-solid-state-drive/ Writing data is a programming operation that sets the data bits to the desired charge state, a process orchestrated by the controller. – Writing data to a page for the first time is nearly as straightforward as reading data. The process grows more complex when modifying that data, which requires that it first be erased and then rewritten, a process commonly referred to as a program/erase cycle (P/E cycle). During a typical P/E cycle, the entire block containing the targeted pages is written to memory. The block is then marked for deletion and the updated data rewritten to another block. The actual erase operation occurs asynchronously in order to optimize performance. https://www.red-gate.com/simple-talk/databases/sql-server/database-administration-sql-server/storage-101-understanding-the-nand-flash-solid-state-drive/

As P/E cycles start adding up, cells start failing. For this reason, SSDs employ several strategies to extend a drive's lifespan, assure reliability, and maintain data integrity, including:

- **Wear leveling:** A controller-based operation for distributing P/E cycles evenly across the NAND chips to prevent any cells from premature failure.
- **TRIM command:** An operating system command for consolidating a drive's free space and erasing blocks marked for deletion, which can improve performance and minimize write application.
- **Over-provisioning:** Extra drive space reserved for management processes such as wear leveling and for reducing the extra write amplification that occurs when a drive gets too full.
- **Caching:** A process of storing data in memory to boost performance and, when used effectively, minimize P/E cycles.
- **Error-correction code (ECC):** A process for checking data for errors and then, if necessary, correcting those errors.

An SSD might also incorporate strategies for improving performance. For example, flash drives implement garbage collection, a background process for moving, consolidating, and erasing data. There's some debate about whether garbage collection adds write amplification or reduces it. It depends on how the garbage collection operations are implemented and the quality of the algorithms used to carry out these operations.

https://www.red-gate.com/simple-talk/databases/sql-server/database-administration-sql-server/storage-101-understanding-the-nand-flash-solid-state-drive/

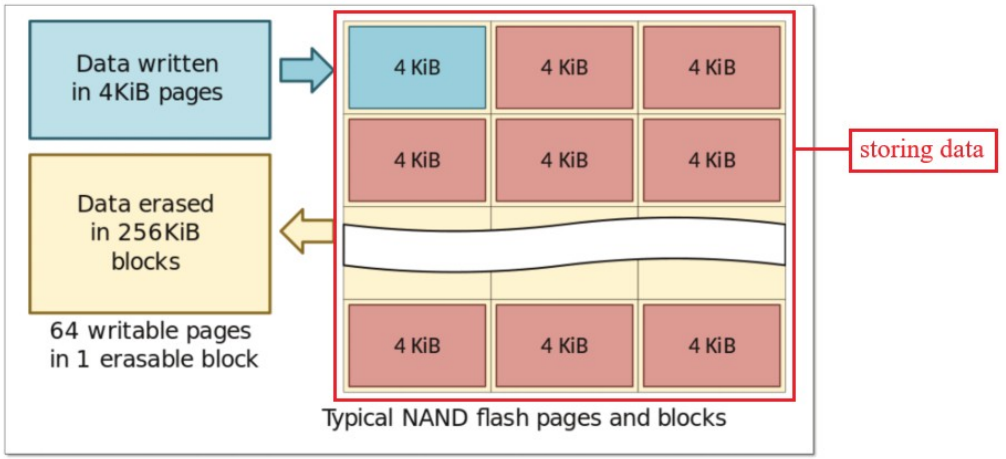


Figure 1. Writing and erasing data in a NAND flash SSD (image by Dmitry Nosachev, licensed under Creative Commons Attribution-Share Alike 4.0 International)

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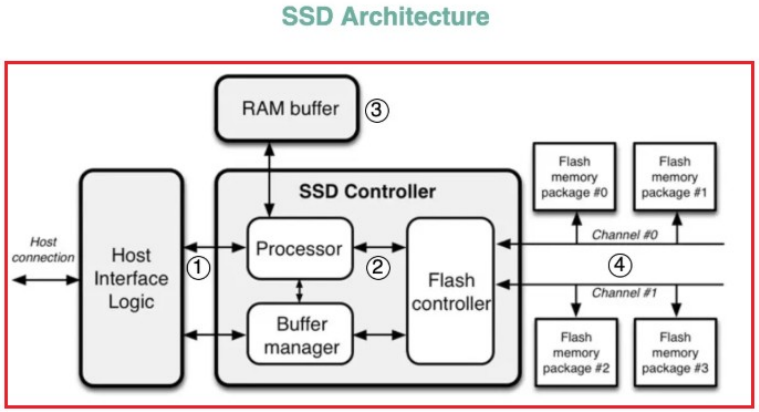
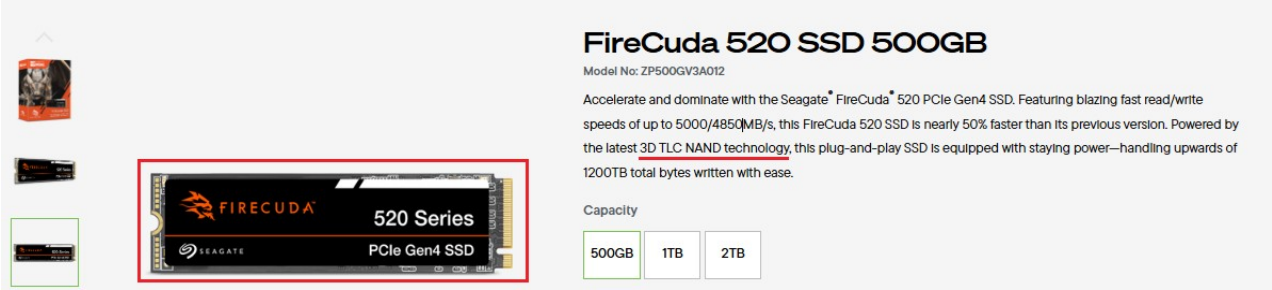
	state-drive/  https://blog.bytebytego.com/p/why-is-a-solid-state-drive-ssd-fast
providing a storage medium as part of the storage system;	The accused product discloses, providing a storage medium (e.g., NAND flash) as part of the storage system (e.g., the accused product). As shown below, the accused product is a storage system which uses 3D TLC NAND flash as the storage medium.  https://web.archive.org/web/20241221014239/https://www.seagate.com/products/gaming-drives/pc-gaming/firecuda-520-ssd/#

https://www.seagate.com/content/dam/seagate/migrated-assets/www-content/datasheets/pdfs/new-firecuda-520-ssd-DS2124-1-2210-en_US.pdf

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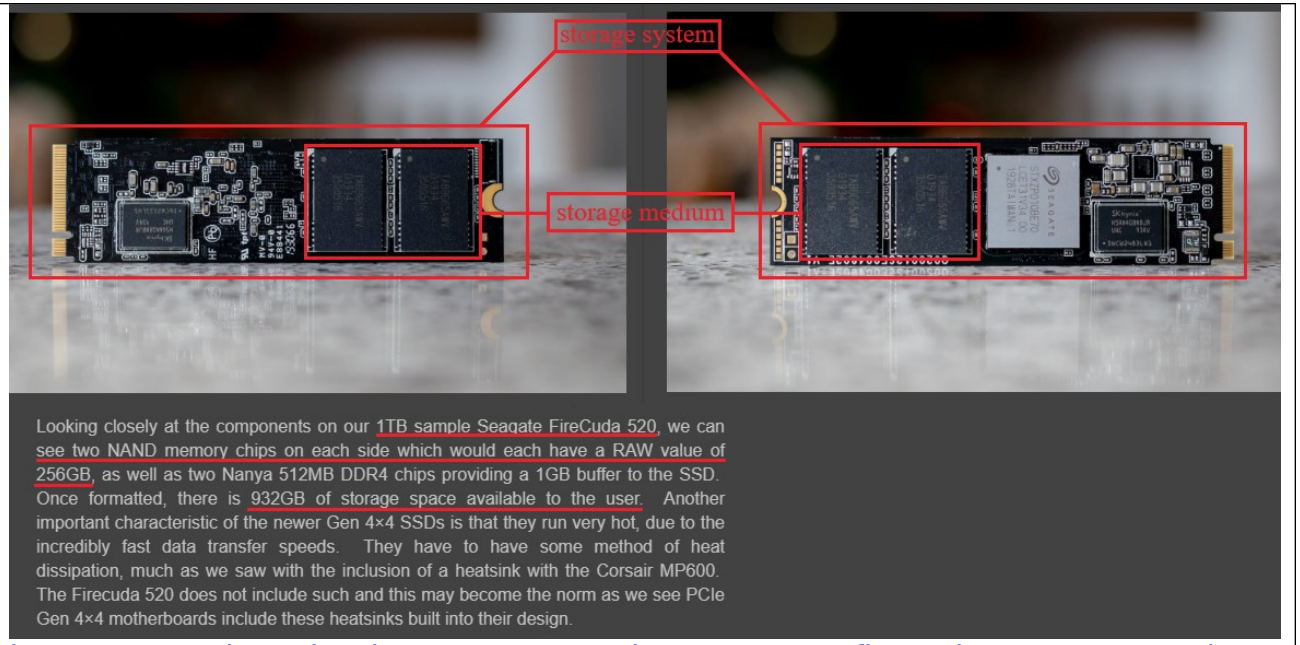
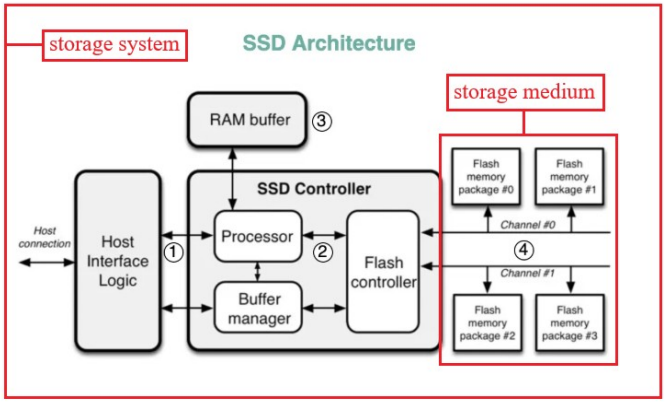
An enterprise SSD contains multiple NAND flash chips for storing data. Each chip contains one or more dies, and each die contains one or more planes. A plane is divided into blocks, and a block is divided into pages.

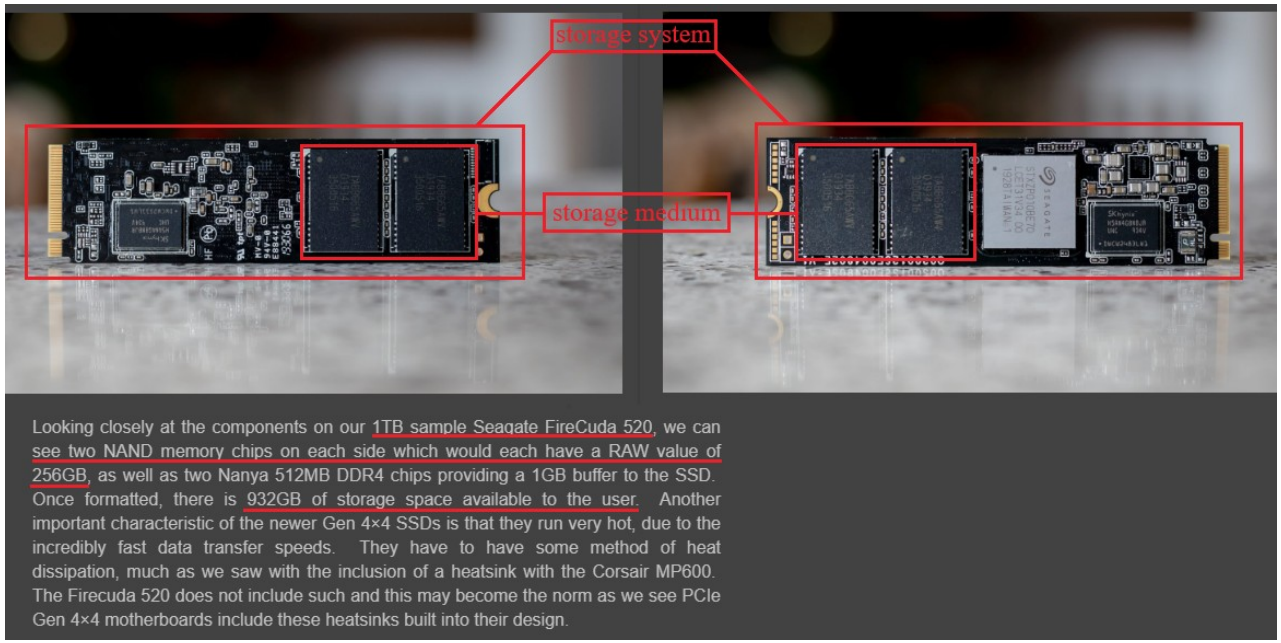
https://www.red-gate.com/simple-talk/databases/sql-server/database-administration-sql-server/storage-101-understanding-the-nand-flash-solid-state-drive/



https://www.thessdreview.com/our-reviews/seagate-firecuda-520-nvme-pcie-4-0-x-4-ssd-review-1tb/



https://blog.bytebytego.com/p/why-is-a-solid-state-drive-ssd-fast

storing general purpose data on the storage medium using a first physical storage format attribute; and	The accused product discloses storing general purpose data (e.g., slower sustained data) on the storage medium (e.g., NAND flash) using a first physical storage format attribute (e.g., memory blocks configured as TLC). As shown below, the accused product is a storage system that uses 3D TLC NAND as its storage medium. Data from the host is written to the storage medium via a controller. The accused product features a 'dynamic SLC' mechanism, which temporarily allocates TLC blocks as an SLC buffer to enhance performance. For time-critical and high-speed tasks, the controller utilizes the SLC buffer, while TLC blocks are used for operations that do not require the high speeds of the SLC buffer but instead demand stable, sustained speeds with minimal fluctuations, such as background data storage and surveillance data recording.  https://www.thessdreview.com/our-reviews/seagate-firecuda-520-nvme-pcie-4-0-x-4-ssd-review-1tb/

TLC Direct Write

TLC direct write is a method of writing data on SSDs that differs from traditional methods. In traditional methods, data is first written to an SLC Cache to achieve high performance. However, when the SLC Cache is full, performance may drastically drop. TLC direct write eliminates the need for an SLC Cache and directly writes data to the TLC (Triple-Level Cell) NAND. This approach ensures a stable and consistent level of write performance. TLC direct write is widely used in applications that require fast and stable write speeds, such as data collection and high-speed photography. It allows for sustained write performance without performance degradation, meeting the demands of data-intensive tasks like surveillance data recording.

https://www.yansen-ssd.com/technology/tlc-direct-write

Comparison	SLC Cache	Direct TLC Write
Peak Performance	Higher	Lower
Performance Stability	Unstable write	Stable write
Suitable Applications	Small, less strenuous transactions • Online transactions • Cloud computing • Online gaming • Infotainment • Enterprise storage • Communications • Transportation system/control • Data recorders	• Boot-up device • Surveillance/monitoring

Table 2. Comparison of SLC cache and direct TLC write

using a first physical storage format attribute

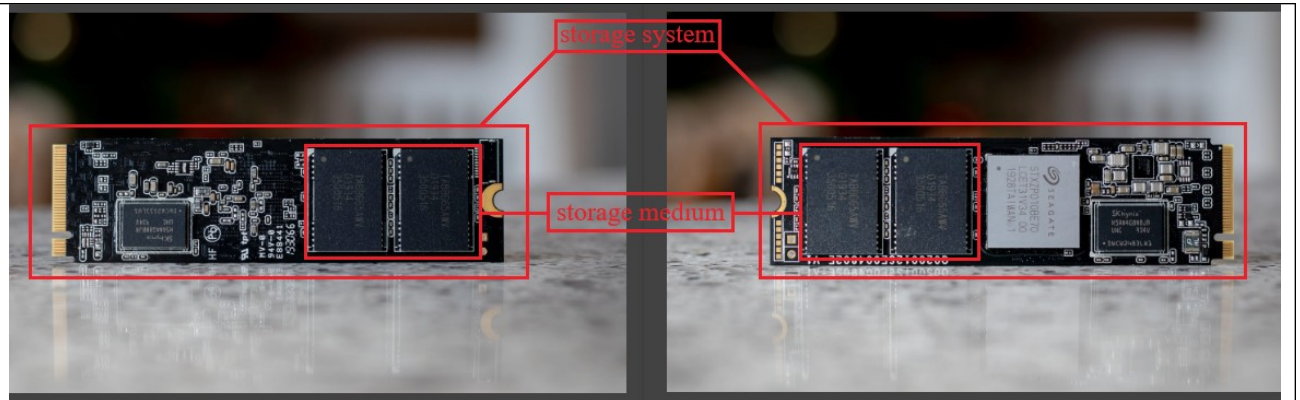
https://www.atpinc.com/blog/what-is-SLC-cache-difference-between-Dynamic-Static-SLC-cache

SLC Caching

The firmware design of the device currently adopts the mixed mode structure with the static SLC and the dynamic SLC to deliver better performance for better endurance and consumer user experience. The dynamic SLC cache size is up to 1/4 of free user capacity of the SSD.

https://www.seagate.com/content/dam/seagate/migrated-assets/www-content/support-content/internal-products/ssd/firecuda-520-ssd/_shared/files/202252300_A-FireCuda-520-product-manual-V2.pdf

	SLC caching is a sophisticated technique used for write caching on SSDs. It enables high transfer speeds for writes, even reaching hundreds of gigabytes on flash memory that typically cannot sustain such speeds. Data written to the cache is swiftly transferred to the TLC or QLC flash memory to ensure the cache is available for peak transfer speeds. https://www.advantech.com/en-us/resources/news/maximizing-ssd-performance-with-slc-cache
storing streaming data on the storage medium using a second physical storage format attribute different than said first physical storage format attribute;	The accused product discloses storing streaming data (high speed low latency data) on the storage medium (e.g., NAND flash) using a second physical storage format attribute (e.g., memory blocks configured as single-bit per cell, SLC) different than said first physical storage format attribute (e.g., memory blocks configured as TLC). As shown below, the accused product is a storage system that uses 3D TLC NAND as its storage medium. Data from the host is written to the storage medium via a controller. The accused product features a 'dynamic SLC' mechanism, which temporarily allocates TLC blocks as an SLC buffer to enhance performance. For time-critical and high-speed tasks, the controller utilizes the SLC buffer, while TLC blocks are used for operations that do not require the high speeds of the SLC buffer but instead demand stable, sustained speeds with minimal fluctuations, such as background data storage and surveillance data recording.



Looking closely at the components on our 1TB sample Seagate FireCuda 520, we can see two NAND memory chips on each side which would each have a RAW value of 256GB, as well as two Nanya 512MB DDR4 chips providing a 1GB buffer to the SSD. Once formatted, there is 932GB of storage space available to the user. Another important characteristic of the newer Gen 4×4 SSDs is that they run very hot, due to the incredibly fast data transfer speeds. They have to have some method of heat dissipation, much as we saw with the inclusion of a heatsink with the Corsair MP600. The Firecuda 520 does not include such and this may become the norm as we see PCIe Gen 4×4 motherboards include these heatsinks built into their design.

https://www.thessdreview.com/our-reviews/seagate-firecuda-520-nvme-pcie-4-0-x-4-ssd-review-1tb/

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https://www.red-gate.com/simple-talk/databases/sql-server/database-administration-sql-server/storage-101-understanding-the-nand-flash-solid-state-drive/

Comparison	SLC Cache	Direct TLC Write
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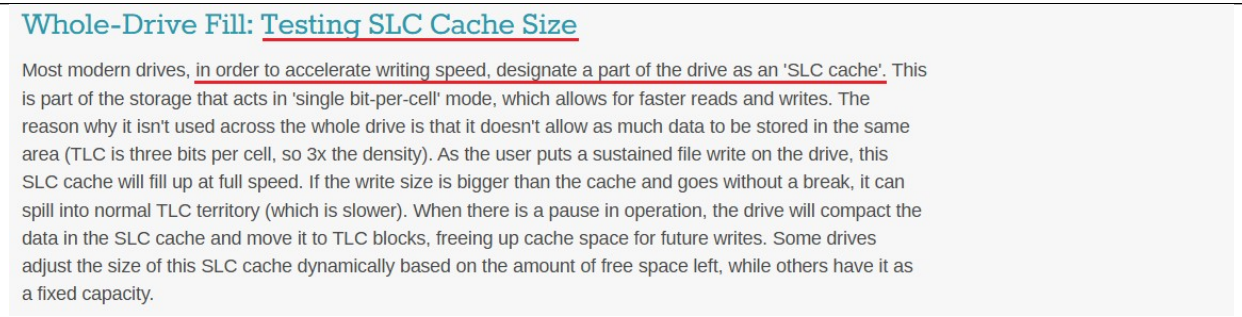
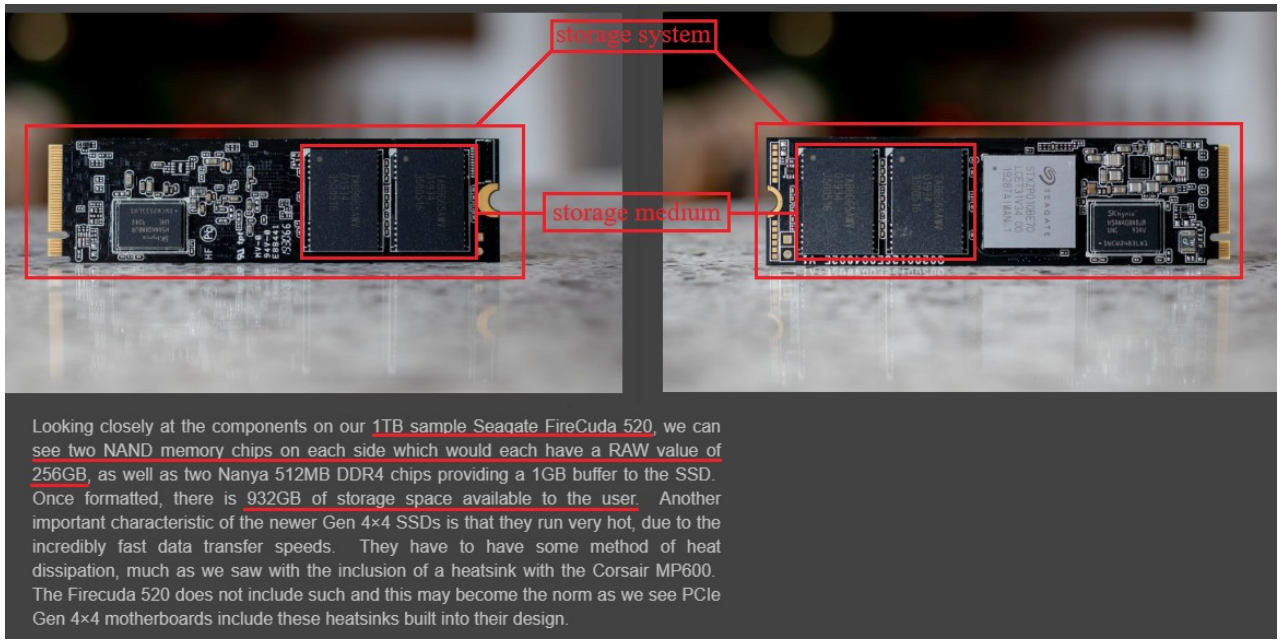
https://www.seagate.com/content/dam/seagate/migrated-assets/www-content/support-content/internal-products/ssd/firecuda-520-ssd/_shared/files/202252300_A-FireCuda-520-product-manual-V2.pdf

The Seagate FireCuda 520 is a solid-state drive in the M.2 2280 form factor, launched on November 30th, 2019. It is available in capacities ranging from 500 GB to 2 TB. This page reports specifications for the 1 TB variant. With the rest of the system, the Seagate FireCuda 520 interfaces using a PCI-Express 4.0 x4 connection. The SSD controller is the PS5016-E16-32 from Phison, a DRAM cache chip is available. Seagate has installed 96-layer TLC NAND flash on the FireCuda 520, the flash chips are made by Toshiba. Please note that this SSD is sold in multiple variants with different NAND flash or controller, which could affect performance, the "Notes" section at the end of this page has more info. To improve write speeds, a pseudo-SLC cache is used, so bursts of incoming writes are handled more quickly. The cache is sized at 370 GB. Copying data out of the SLC cache (folding) completes at 600 MB/s. Thanks to support for the fast PCI-Express 4.0 interface, performance is excellent. The FireCuda 520 is rated for sequential read speeds of up to 5,000 MB/s and 4,400 MB/s write; random IO reaches 760K IOPS for read and 700K for writes.
At its launch, the SSD was priced at 250 USD. The warranty length is set to five years, which is an excellent warranty period. Seagate guarantees an endurance rating of 1800 TBW, a good value.

https://www.techpowerup.com/ssd-specs/seagate-firecuda-520-1-tb.d190

	 https://www.anandtech.com/show/13759/comparing-adata-sx8200-pro-vs-hp-ex950/2
said first and second physical storage attributes being associated with differing storage qualities selected from the group consisting of: resilience to errors, data integrity, storage density, and storage capacity.	The accused product discloses storing data using first and second physical storage attributes (e.g., memory blocks configured as SLC and TLC), said first and second physical storage attributes (e.g., memory blocks configured as SLC and TLC) being associated with differing storage qualities selected from the group consisting of: resilience to errors, data integrity, storage density, and storage capacity. As shown below, the accused product is a storage system that uses 3D TLC NAND as its storage medium. Data from the host is written to the storage medium via a controller. The accused product features a 'dynamic SLC' mechanism, which temporarily allocates TLC blocks as an SLC buffer to enhance performance. For time-critical and high-speed tasks, the controller utilizes the SLC buffer, while TLC blocks are used for operations that do not require the high speeds of the SLC buffer but instead demand stable, sustained speeds with minimal fluctuations, such as background data storage and surveillance data recording. Furthermore, the SLC and TLC blocks used to store different types of data differ in storage qualities such as speed, storage density, resilience to errors, endurance, and more. SLC blocks are much faster than TLC blocks and have higher resilience to errors. TLC blocks have triple the storage density of SLC

	blocks. For the same price, TLC blocks provide more storage capacity compared to SLC blocks.  https://www.thessdreview.com/our-reviews/seagate-firecuda-520-nvme-pcie-4-0-x-4-ssd-review-1tb/ **SLC Caching** The firmware design of the device currently adopts the mixed mode structure with the static SLC and the dynamic SLC to deliver better performance for better endurance and consumer user experience. The dynamic SLC cache size is up to 1/4 of free user capacity of the SSD. https://www.seagate.com/content/dam/seagate/migrated-assets/www-content/support-content/internal-products/ssd/firecuda-520-ssd/_shared/files/202252300_A-FireCuda-520-product-manual-V2.pdf

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https://www.techtarget.com/searchstorage/tip/The-truth-about-SLC-vs-MLC